

CURRENT STATUS OF THE PRESCHOOL VITAMIN A CAPSULE SUPPLEMENTATION PROGRAM IN RURAL BANGLADESH

Introduction

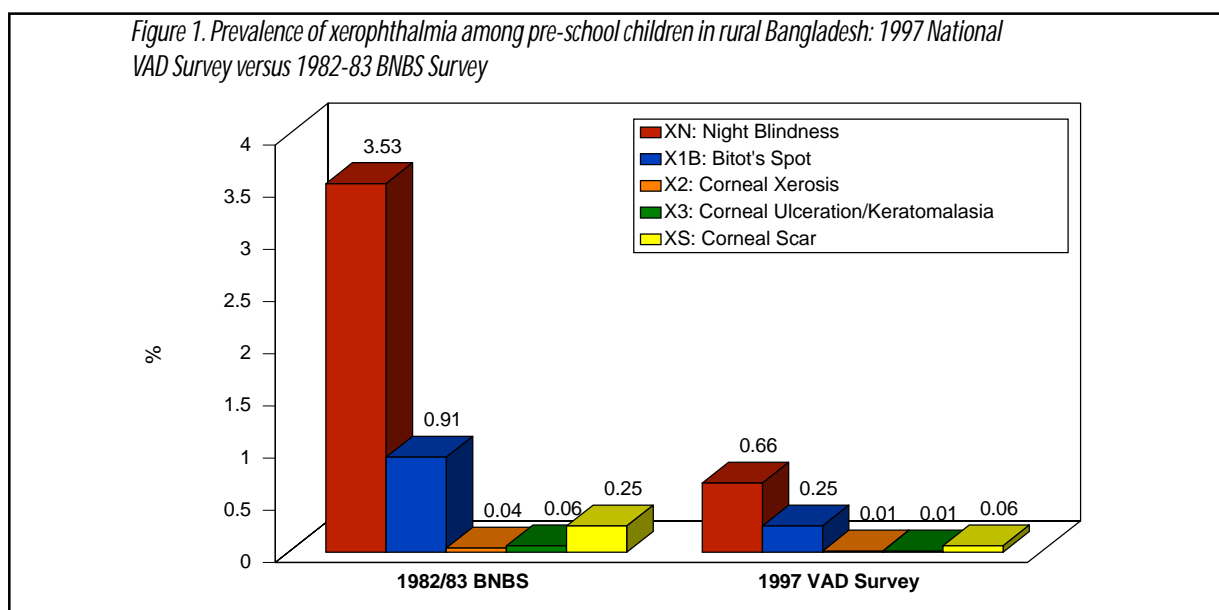
Vitamin A deficiency is a condition that has been known for ages to cause blindness--particularly in pre-school children. The 1982-83 Bangladesh Nutritional Blindness Study (Fig. 1) found extremely high rates of ocular manifestations of vitamin A deficiency in Bangladesh, including night blindness and xerophthalmia, and raised concern about the number of children going blind from such an easily preventable problem. Since that time, an analysis of numerous scientific studies has shown that in addition to preventing xerophthalmia, regular vitamin A supplementation can reduce child mortality rates by an average of 23 percent in developing countries (Beaton, 1993).

Findings from the recent vitamin A deficiency (VAD) survey suggest that the prevalence of clinical vitamin A deficiency among pre-school children has decreased markedly in rural Bangladesh over the past 15 years (Fig. 1). This survey found that the vitamin A capsule (VAC) program has played an important role in this decline of xerophthalmia. Children who had not received a vitamin A capsule in the past six months were almost two times as likely to be night blind than children who had received a capsule (OR=1.81, 95% CI 1.28, 2.56). These findings have profoundly positive implications for child health in Bangladesh, especially given the vast improvements in VAC coverage that have occurred within the past three years.

The current program of vitamin A capsule distribution is conducted during two semi annual campaigns: 'Vitamin A Week' in June and the National Immunization Days (NID) for polio in December. During these campaigns, preschool children (aged 12-59 months) are brought to outreach centers in rural and urban Bangladesh for VAC supplementation. Data collected by the Nutrition Surveillance Project (NSP), operated by Helen Keller International (HKI), the Institute of Public Health Nutrition (IPHN) and partner NGO's, has documented that this campaign approach has enabled Bangladesh to maintain capsule coverage of approximately 80 percent in rural areas since December, 1995. Little information has been available, however, about why approximately 20 percent of the target age group do not receive vitamin A capsules each round, despite the campaigns, and how coverage might be increased to include these children. This document reports the most recent information available from the NSP regarding the vitamin A distribution program for preschool children in Bangladesh, with the goal of providing information that will be useful in fine-tuning a very successful national vitamin A supplementation program.

Methodology and Sampling

The NSP routinely collects nutrition, agriculture, food, and health information, through surveys of a random sample of children and households throughout Bangladesh every two months. Each round, information is collected from 40 clusters from each of the six



administrative divisions of rural Bangladesh, resulting in a sample of approximately 1,200 households per division. Divisional estimates are weighted according to population proportions to arrive at nationally representative estimates.

For the June-July, 1998, cycle of the NSP (Round 50), a special questionnaire was added to the regular data collection routine to help identify characteristics associated with children not receiving VAC, to explore sources of information about VA Week, to identify reasons why households and children do not participate in VA Week, and to find out how participation in VA Week is managed by households.

Approximately 8,750 survey respondents with children 12-59 months of age were asked whether their children had received a VAC during the Vitamin A Week in June 1998 and also during the December 1997 National Immunisation Day (NID). In order to minimise bias due to the relatively long recall period for the NID (6 months), enumerators were trained in the use of in-depth recall techniques linking the NID to specific events at that time of the year to trigger the memories of the respondents. These techniques were validated by the fact that national coverage rates for the 1997 NID collected during the June/July 1998 round were virtually identical to those collected by the project immediately following the NID in February, 1998 (88.0% vs 89.2% respectively). This data allows us to determine the percentage of eligible¹ children who received vitamin A capsules every six months during the previous year according to the current government protocol.

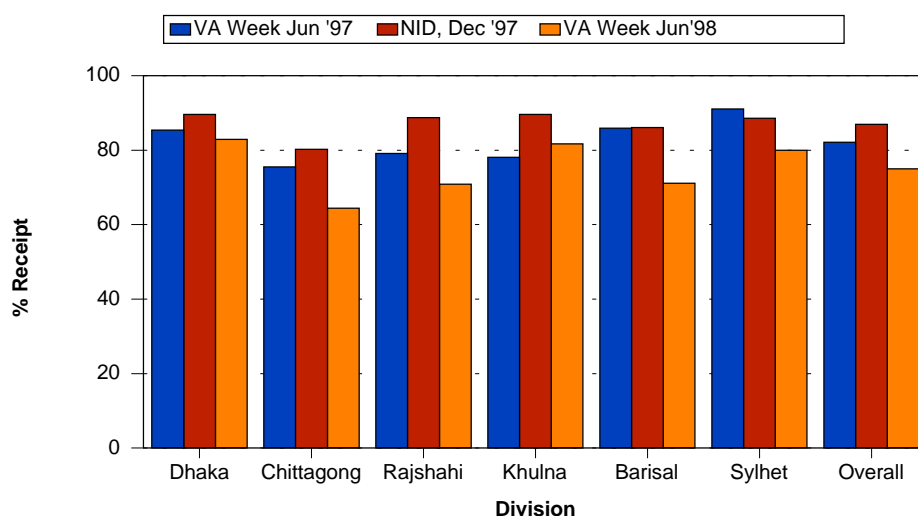
Respondents were also asked to reply to a series of questions specifically regarding the 1998 Vitamin A (VA) Week campaign. Respondents of children who received a VAC during the campaign were asked several questions about where they had learned about the 1998 VA Week campaign and about who had brought the child to the outreach center. Respondents for children who had *not* participated in the VA Week were asked to provide reasons why the child had not received a capsule.

VAC Coverage 1997-1998

Figure 2 shows divisional estimates of VAC coverage for the past three distribution campaigns held in June 1997 (VA Week), December 1997 (NID), and most recently in June 1998 (VA Week). The figure shows that while VAC coverage was good for all three campaigns, the NID has achieved coverage rates approximately five percent higher than VA Week 1997 and 10 percent higher than VA Week 1998. This pattern can probably be attributed to a much wider national awareness that is achieved during the NID in efforts to distribute vaccines and VAC in a one-day program. Divisional comparison reveal that during the most recent VA Week, Dhaka, Khulna, and Sylhet divisions exceeded 80 percent coverage while Rajshahi and Barisal Divisions barely exceeded 70 percent coverage. Chittagong Division achieved only 64% coverage during this round; distribution may have been hindered by flash floods occurring during the week of distribution. Nevertheless, the historically lower coverage patterns observed in Chittagong Division probably warrant further review of the distribution system.

¹ Currently the government distributes a high-potency (200,000 IU) VAC to all children between the ages of 12-59 months.

Figure 2. VAC Coverage by Division for NID and VA Weeks, 1997-98



Factors Associated with Non-receipt of Capsules

In order to better understand characteristics of children not being reached during the VAC campaigns, data from Rounds 48 and 50 of the NSP were analysed to identify household and child related factors associated with VAC receipt during the 1997 NID and 1998 VA Week. Table 1 (below) presents a basic summary of the association of these characteristics on vitamin A receipt for each round. Areas shaded in grey indicate that there was a

statistically significant difference in the percentage of children receiving the capsule by a given factor for that round.

The shaded areas allow us to identify characteristics that have been consistently associated with VAC receipt for both the distribution rounds. For both rounds, children with educated mothers, children from less vulnerable households, and children older than 24 months at the

Table 1. Characteristics of recipients and non-recipients of VAC from the 1997 NID and 1998 Vitamin A Week

Household-level Factors	NID, 1997 ^a	VA Week, 1998 ^a
	% VAC Coverage	% VAC Coverage
Educated ^b mother (1+ grades)	91.4	76.7
No formal education	87.5	74.4
Educated ^b father (1+ grades)	90.6	76.1
No formal education	87.7	75
Vulnerability status ^c (Less vulnerable)	90.1	76.2
Vulnerable	86.7	72.3
Single under-5 child HH	90.2	75.7
Multiple under-5 children	87.3	73.8
Child factors		
Age 24-59 months at delivery	89.8	75.7
Age <24 months	87.3	72.9
Sex (male)	89.7	75
Female	88.5	75
Wasting (≥-2 SD)	89.2	76
(< -2 SD)	89.4	74.8
Stunting (≥-2 SD)	90.7	75.3
(< -2 SD)	88.2	74.9

^a Grey shading denotes a statistically significant difference characteristic for that round ($p < 0.05$) in VAC coverage percentages by each of coverage (χ^2 test, 1 degree freedom).

^b Education is defined as completion of at least one formal grade.

^c Vulnerable households are defined as those with no cultivable land and whose main earner depends on casual or short-term labor for income.

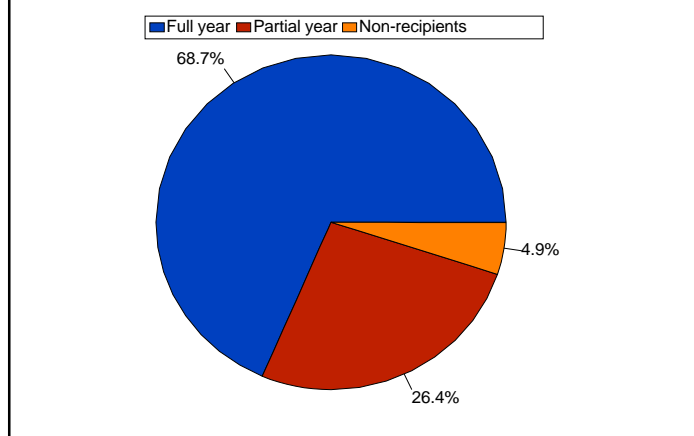
time of distribution were significantly more likely to have received a VAC capsule compared to children not possessing each characteristic.

Although the information shown in Table 1 has important health and nutrition implications, from a programmatic perspective, the implications are limited. While the grey areas show consistent patterns, we see from a closer look at the numbers that there are actually only quite small percentage differences in VAC receipt for each characteristic. For example, the difference in VAC coverage between children with educated mothers and those with uneducated mothers was only 3-4%. While this means that coverage might be expected to improve over time with increases in maternal education, it does not mean that the most efficient way to increase VAC coverage is to directly address maternal education. Thus, these differences do not appear to explain why 20% of children are not being reached by the campaigns. For this reason, we present results of a special survey designed to explore patterns associated with distribution over an entire year (two campaigns) and to illuminate possibilities for more direct interventions to increase coverage.

Coverage Over An Entire Year

During the special survey of Round 50, respondents were asked whether their pre-school children had received the capsule during the VA Week and also during the previous NID (December 1997). We believe that this is the first time that information has been collected in Bangladesh about *campaign-specific coverage* over an entire year, and that it offers information particularly relevant to policy makers. The results are presented in Figure 3; 68.7 percent of children received VAC during both the December 1997 NID and the June 1998 VA Week (noted here as 'full year' recipients); 26.4 percent received VAC during only one of these campaigns (termed 'partial year'

Figure 3. Year round VAC coverage, December 1997 and June 1998

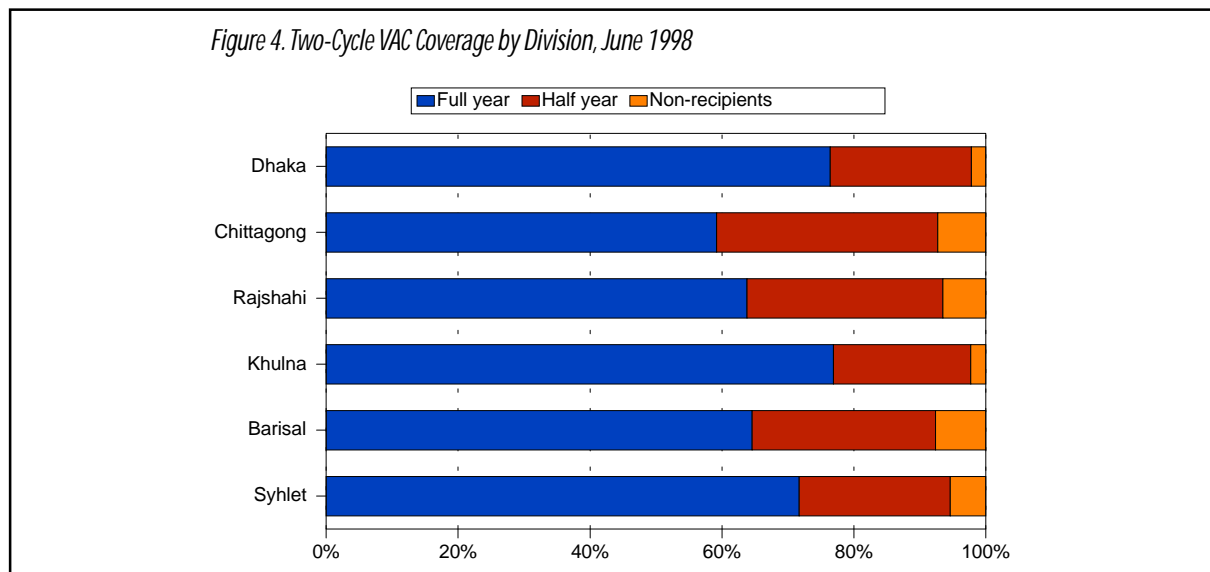


recipients); and 4.9 percent did not receive VAC in either June or December (termed 'non' recipients).

The findings suggest that a significant proportion of children in rural Bangladesh (95.1%) receive at least one capsule per year. Only a small percentage (4.9%) of preschool children in rural Bangladesh appear to have been consistently missed by the distribution programs during the course of the past year. However, a relatively large proportion of eligible children (26.6%) received only one VAC in the past year, and of these children, approximately 75 percent received the capsule through the NID, while only 25 percent received the capsule through the VA Week program. These findings refute the hypothesis that a pocket of children (20% of the population) is repeatedly missed each round, but suggests that children are receiving VA capsules intermittently during their pre-school years.

Figure 4 provides information on full-year, partial year, and non-coverage by administrative division. From a divisional standpoint, the largest pockets of non-covered

Figure 4. Two-Cycle VAC Coverage by Division, June 1998



and partially covered children are in Chittagong, Rajshahi, and Barisal Divisions. Khulna, Sylhet, and Dhaka Divisions appear to have higher proportions of children who have received VAC over the full year.

We conclude from these results that more effort needs to be made to increase parental knowledge of the fact that children need to receive vitamin A capsules twice yearly. Given that 95 percent of families are reached by at least one distribution round, distribution centers, particularly NID centers would be an ideal venue to communicate this knowledge and more adequately turn the large segment of "partial year" recipients into full-year recipients.

Reasons for Non-Receipt of Capsules: 1998 VA Week

Table 2 shows the reasons respondents provided for why their children did not receive a capsule during Vitamin A Week, 1998. Overall, the major reason given for non-receipt of capsules was lack of knowledge about the campaign. This means that more publicity should be used to reach families in rural areas, especially through effective media channels (see next section).

A surprisingly high percentage of families (6.7%) brought their children to the center only to find that they were either too late or that the workers had left the site. This indicates that better communication of the time and venue of distribution at the ward level needs to be achieved and staffing of the centers should be better supervised. Survey enumerators also reported that a

large proportion of the families in the "Other" category went to the center only to find that supplies of VAC were exhausted. Both of these reasons for non-coverage might be expected to have adverse effects on future coverage and indicate that better co-ordination of staff and logistics of capsule distribution might be expected to increase coverage. Location of distribution centers did not appear to be a major barrier to coverage, as only 1.5 percent of the respondents cited this as a reason for non-receipt.

This survey also provided evidence that more needs to be done to promote knowledge about the importance of vitamin A among the rural population. Nearly 10 percent of non recipients were too busy with other activities to bring their children to the center, while two percent did not consider VAC to be beneficial to the child. Qualitative interviews at distribution sites by HKI suggest that a common conception among the population is that National Vitamin A week involves immunisations of some sort (polio, measles), and that people did not seem to be aware of the fact that preschool age children should receive VAC capsules twice yearly. A communications campaign stressing the child survival effects of vitamin A might be a means of increasing the perceived importance of this program.

Relatively few differences in background characteristics were found between non-recipients over the previous year and partial year recipients (NID receipt only). Significantly greater percentages of children with educated mothers, older children, and less stunted

Table 2. Reasons why children did not receive vitamin A capsules during VA Week, 1998, "non-recipients" ^a vs. "partial year recipients" ^b, "and overall" ^c

		Non recipients ^a (n=314)	Partial year recipients ^b (n=1229)	Overall VA Week, 1998 ^c (n=1543)
1	Didn't know about campaign	55.4%	49.6%	50.8%
2	Got there too late/ worker not present	4.8%	7.2%	6.7%
3	Location too far away	0.6%	1.7%	1.5%
4	Busy with other activities	7.6%	9.6%	9.2%
5	Did not consider VAC to be beneficial	1.9%	2.1%	2.1%
6	Family considered child too young for VAC	1.9%	0.3%	0.6%
7	Child was sick	0.3%	0.8%	0.7%
8	Other reasons ^d	18.2%	23.0%	22.0%
9	Don't know	9.2%	5.5%	6.3%
	Total	100%	100%	100%

^a Non recipients did not receive a capsule during either VA Week, 1998 or NID 1997.

^b Partial year recipients in this table received a capsule during VA Week, 1998, but not NID 1997.

^c Overall non-recipients during VA Week, 1998.

^d Major reasons falling into the category "Other" included child absence and inadequate supplies of VAC at the distribution location.

Table 3. Sources of information about the 1998 Vitamin A Week by rural Division: Percentage* of VAC recipients of 1998 National VA Week reporting that they heard about VA Week, by source

	Dhaka (n=1897)	Chittagong (n=964)	Rajshahi (n=1263)	Khulna (n=651)	Barisal (n=362)	Sylhet (n=344)	Overall (n=5483)
Health/FP Worker	77.3	60.9	80.0	74.8	81.3	71.5	74.6
Neighbor	22.2	5.5	28.3	15.9	12.2	7.6	18.3
<i>Miking</i>	13.9	26.2	10.6	13.2	5.8	22.8	15.2
Radio	5.3	9.6	7.1	14.4	16.6	6.5	8.3
Family/Relative	2.9	10.1	12.2	3.5	6.2	12.5	7.2
Volunteer/NGO	3.5	7.8	4.6	16.2	1.1	20.5	6.9
TV	6.6	8.7	1.8	7.5	3.3	9.3	5.9
School/club	5.8	4.7	0.0	2.0	5.1	6.7	3.8
Elite person	0.6	3.0	0.1	0.5	0.5	5.7	1.2
Poster	0.2	0.9	0.0	0.5	0.5	1.2	0.4

*Respondents were permitted to give up to three sources; percentages shown are the cumulative percentage of these responses using the number of VAC recipients as the denominator and therefore do not add up to 100 percent.

children were all more likely to be 'partial year recipients' than non-recipients (χ^2 test, df=1, $p<0.01$). Land ownership, vulnerability status, number of children, family size, sex, father's education, wasting, and underweight did not significantly differ between the partial receipt and non-recipient groups.

Reaching Households with Information about the VA Campaigns

Community mobilization is the essential reason for the continued high coverage rates of both the VA Week and NID campaigns over the past 4-5 years. Radio, television, and *miking*, or the broadcasting of messages using loudspeakers, are mass media approaches integral to raising awareness about the dates of upcoming vitamin A distribution campaigns in Bangladesh, especially among the elite. However, during Vitamin A Week, distribution of capsules in rural areas occurs over an entire week in each *thana*, with health and family planning workers and volunteers rotating the venue in coordination with the monthly cycle of the Expanded Programme on Immunisations (EPI). Thus, communication of the specific venue and date of

distribution is especially important to program effectiveness, and can only be achieved through local media.

Table 3 presents the percentage of VAC recipients reached by each of the different interpersonal and mass media channels for VA Week, 1998. In rural areas, it was obvious that interpersonal communication was the most effective way to reach people. Health and family planning workers were, by far, the greatest source of information about VA week, reaching 74.6 percent of households that had received a VAC. Interpersonal communication with neighbors was the second most effective source (18.3%) and communication by family/relatives was fifth (7.2%).

Miking was especially effective in reaching families living in Chittagong and Sylhet. Enumerators from these areas reported that *miking* from mosque loudspeakers was prevalent particularly in the areas with large conservative Muslim populations. Thus, incorporating religious leaders in local awareness campaigns may be an approach that can be successfully adopted in other areas of Bangladesh.

Table 4. Who Brings the Child to Receive VAC? (values shown are in percent)

	Dhaka	Chittagong	Rajshahi	Khulna	Barisal	Sylhet	Overall
Mother	40.1	25.0	49.3	39.0	27.1	39.9	38.6
Father	5.8	2.7	4.4	3.1	2.5	16.3	5.0
Grandparent	4.3	5.5	6.1	8.8	5.3	9.9	5.9
Sibling/Relative	20.3	16.4	17.7	19.0	21.4	18.1	18.8
Neighbor	4.0	2.0	5.1	4.5	1.9	2.9	3.7
Other	1.1	0.2	1.2	0.9	0.8	1.5	0.9
VAC delivered to household	24.6	48.2	16.2	24.7	41.0	11.4	27.1

It appears that NGOs might be under-utilised for disseminating information in rural areas about an upcoming VA Week campaign. Posters, radio and TV do not seem to be common sources of information about VA Week for the majority of households.

Thus, information and messages about the VA week should not be targeted only to mothers. Interestingly, a large proportion of children still had the VAC delivered to their household, particularly in Chittagong and Barisal divisions.

Who Brings Children to Distribution Centre?

Respondents in rural areas were also asked about who brought their child(ren) to the distribution sites (Table 4). In all divisions, the majority of children were brought to the outreach center by their mothers. It is evident, however, that other family members or siblings also commonly bring children to the center to receive the capsule. This information may be useful for targeting communications programs. It is also interesting to note that in many areas, VAC is still delivered to households, despite policies designed to encourage central site delivery. In Chittagong and Barisal Divisions, more than 40% of recipients had VAC delivered directly to their households. The necessity of this type of delivery in these areas should be explored, along with potential impacts on coverage.

Conclusions and Recommendations

- The high VAC coverage maintained over the past three years in Bangladesh is laudable. The campaign approach, both via NID and Vitamin A Week, has been an effective means to provide VA capsules to pre-school children and is partially responsible for the large reduction in xerophthalmia over the past 15 years.
- Coverage during NID is somewhat higher than VA Week, and approximately 20% of surveyed children over the previous year received VAC from the NID but did not receive it at VA Week. To increase coverage during VA week, more effort and resources should be devoted to raising awareness using effective channels.
- Factors influencing whether a child receives a VA capsule include mother's education, child's age, and socio-economic status. In general, however, differences in percentage coverage by these factors are small but statistically significant.
- Approximately 30 percent of children do not receive 'full' VAC coverage over the course of a year, i.e., they do not receive capsules in both campaigns. 'Full' coverage is lowest in Chittagong, Rajshahi and Barisal. It might be helpful to promote messages during the campaigns about the importance of getting two preventive doses of VA per year, especially during NID campaigns because of higher coverage.

- The main reasons given for not participating in VA Week was that the respondent did not know about the campaign or there was no worker at the clinic. This suggests that broader and more effective information dissemination is needed at the local level. Thana and sub thana managers should decide on media sources that are most appropriate in effectively reaching their populations, with information from this survey as a guide.

- The main sources of information about the campaign in rural areas were the health care workers. The use of interpersonal communication by NGOs and miking are also popular means of communication in some rural divisions and might be expanded in other divisions. Posters have not been found to be effective in disseminating information about VA Week and should not be widely promoted.
- Mothers, as well as siblings and other family members often bring the child to the health center to receive the capsule. Future communications messages might target these populations.
- Nationally, approximately 30 percent of children receiving a VAC had it delivered to their house despite the campaign approach that is stressed. In Chittagong and Barisal, house-based delivery exceeded 40 percent. Further investigation of the necessity of this type of delivery in these areas and of potential impact on coverage might be undertaken.
- Chittagong Division repeatedly has lower coverage than other the divisions. A special review of the constraints faced by the districts and sub-districts in this division, including methods of delivery, might be warranted.

BIBLIOGRAPHY

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Terms

Stunting: The percentage of children 6-59 months with height-for-age < -2 Z scores, chronic malnutrition.

Standard deviation scores: A measurement of how far a child's nutritional status deviates from the internationally recommended reference population (WHO/NCHS). Malnutrition is defined as less than -2 standard deviations from the mean (< -2 Z scores).

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